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# The Economic Geography of Fossil Fuel Divestment, Environmental Policies and Oil and Gas Financing

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# Based on our recent paper

## The Economic Geography of Fossil Fuel Divestment, Environmental Policies and Oil and Gas Financing

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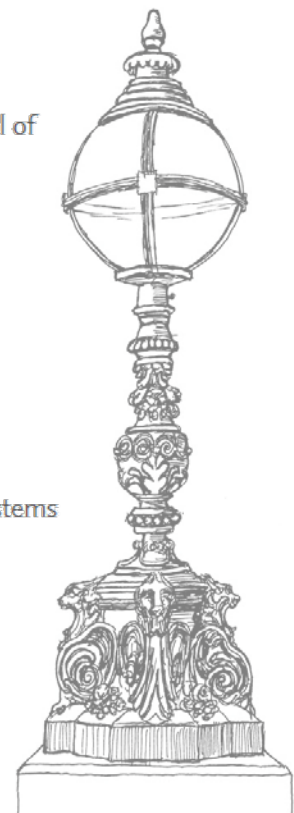
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Date Written: April 22, 2019



## Before we start, a question to reflect on

To stabilize global warming at 4°C, what is the reduction required in the levels of GHG emissions worldwide?

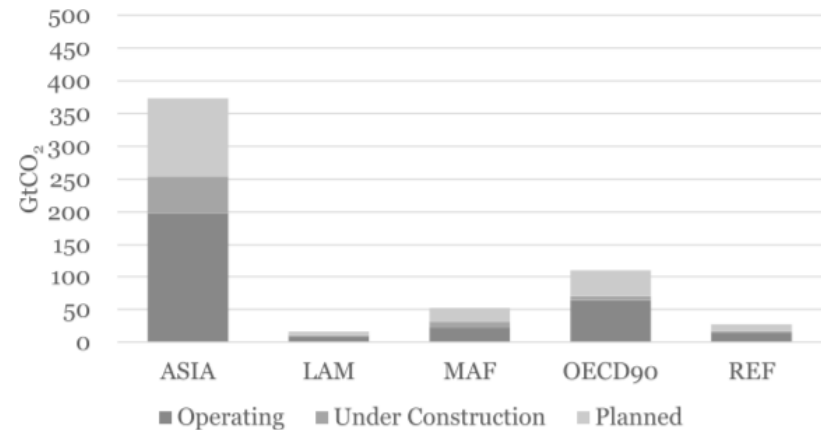
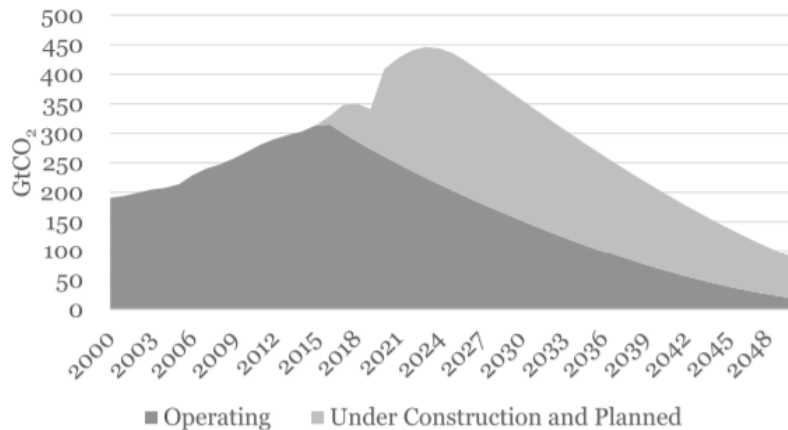
- a) 0% - 30%
- b) 30% - 60%
- c) 60% - 80%
- d) 80% - 90%
- e) 90% - 100%



To stabilize global warming at any level, GHG emissions must eventually reach **net-zero levels**.  
(Matthews and Caldeira 2008)



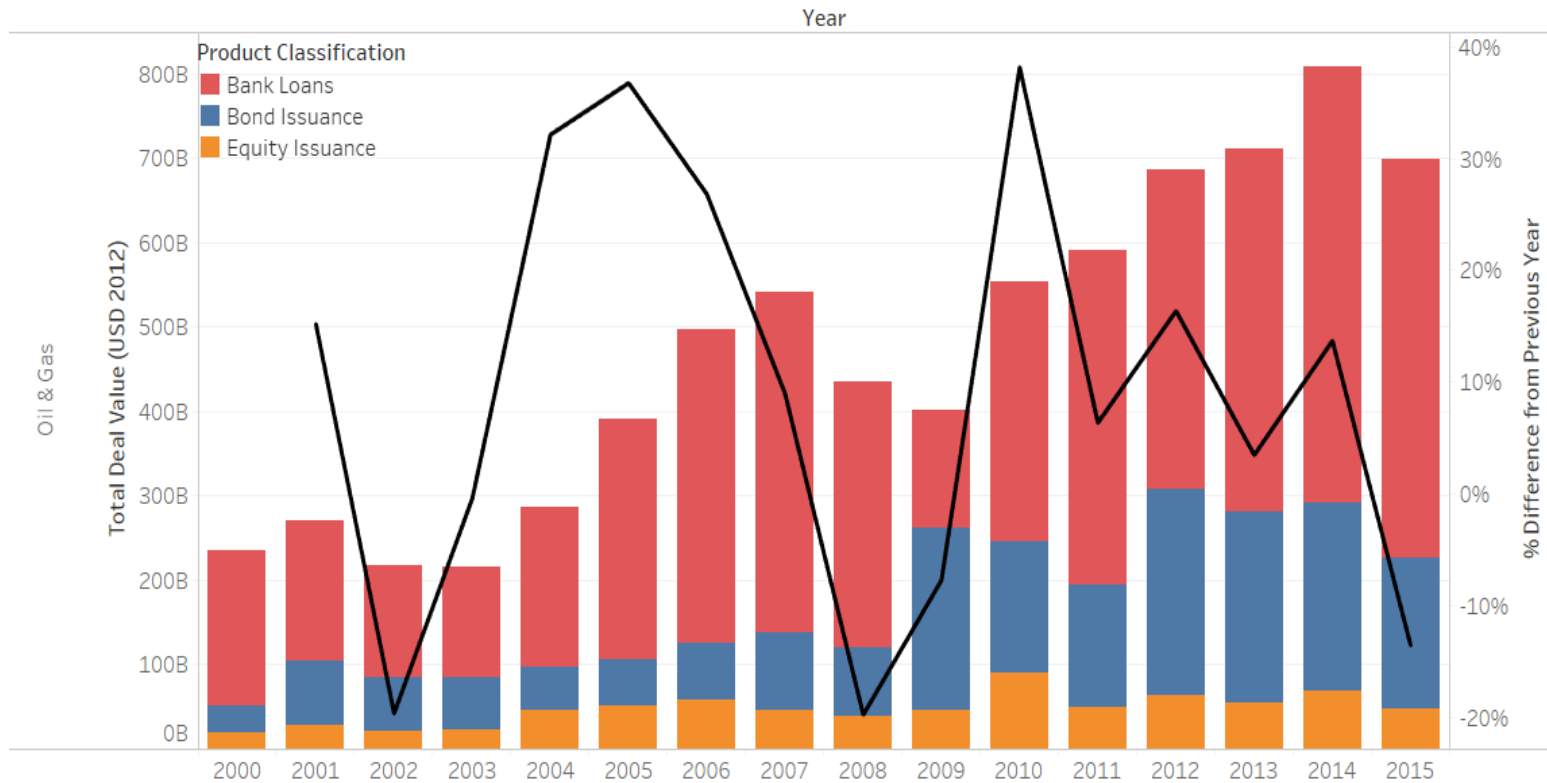
# Power sector alone takes us past Paris targets



Source: Pfeiffer et al. (2018)

“[...] operating generators still commit us to emissions (~300 GtCO<sub>2</sub>) above the levels compatible with the average 1.5 °C–2 °C scenario (~240 GtCO<sub>2</sub>).[...] the current pipeline of power plants would add almost the same amount of additional commitments (~270 GtCO<sub>2</sub>).” (Pfeiffer et al. 2018, p.1)

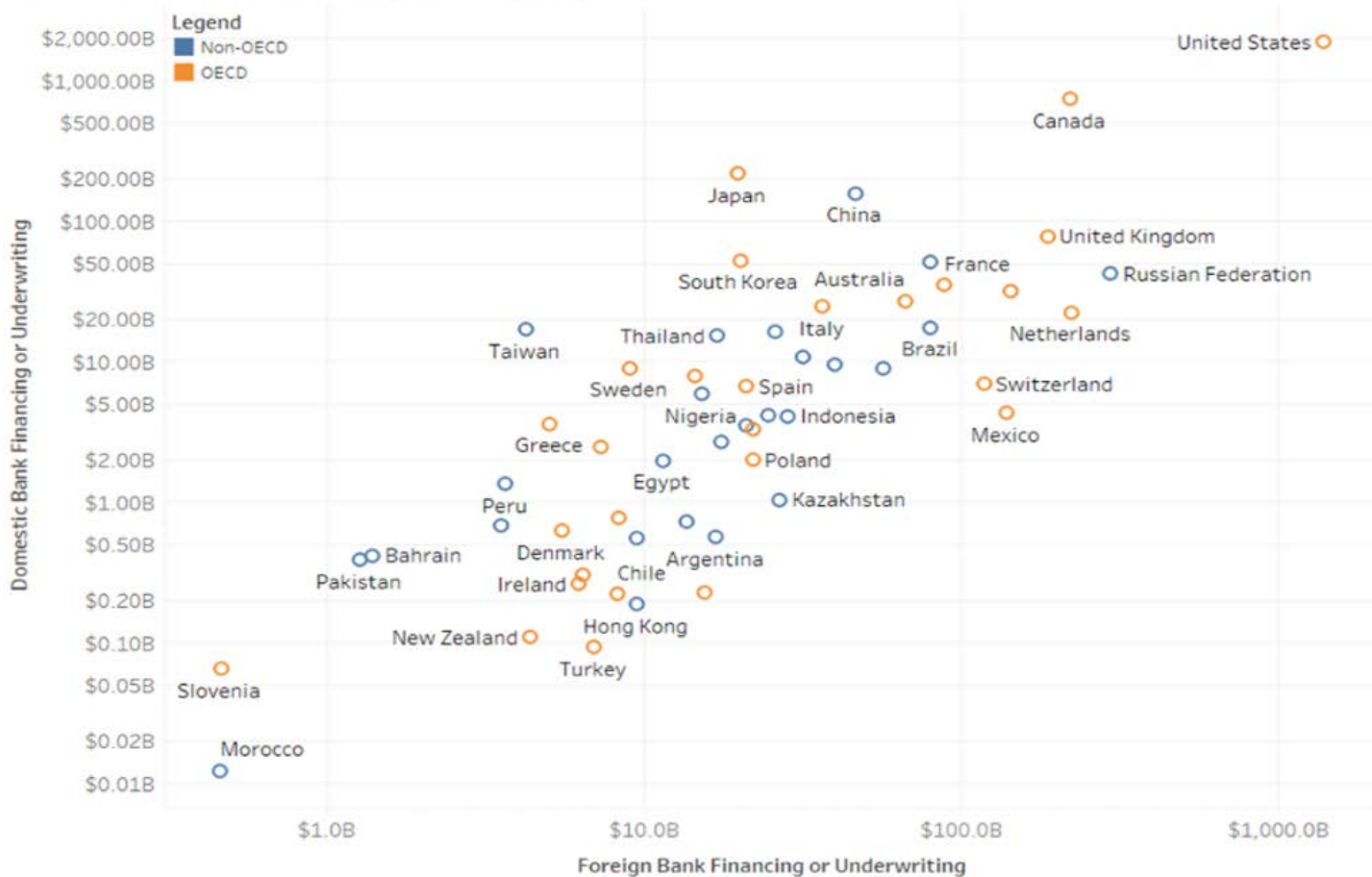
# How do we finance fossil fuels?



Global oil and gas financing across asset classes (2000 – 2015). Source: Dealogic

# Who needs financing?

Oil & Gas Total Fundraising by Company Domicile



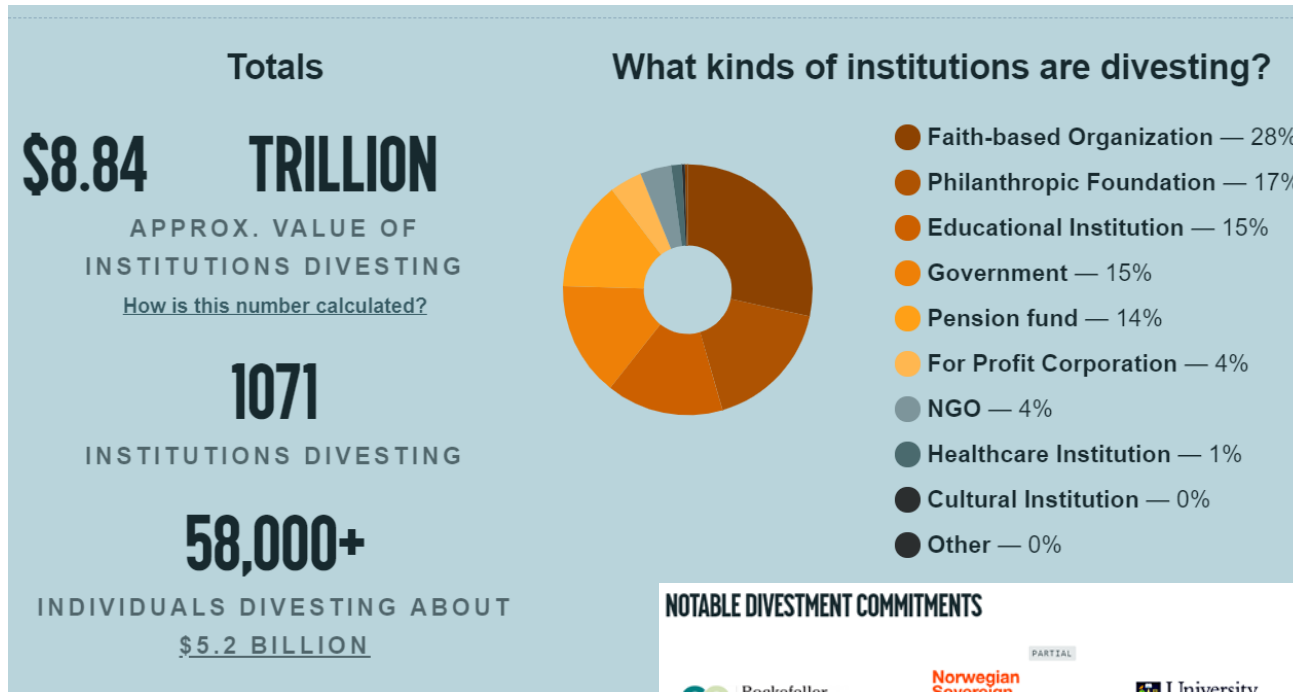
Global oil and gas financing across asset classes (2000 – 2015). Source: Dealogic

# Fossil fuel divestment around the world





# Fossil fuel divestment around the world



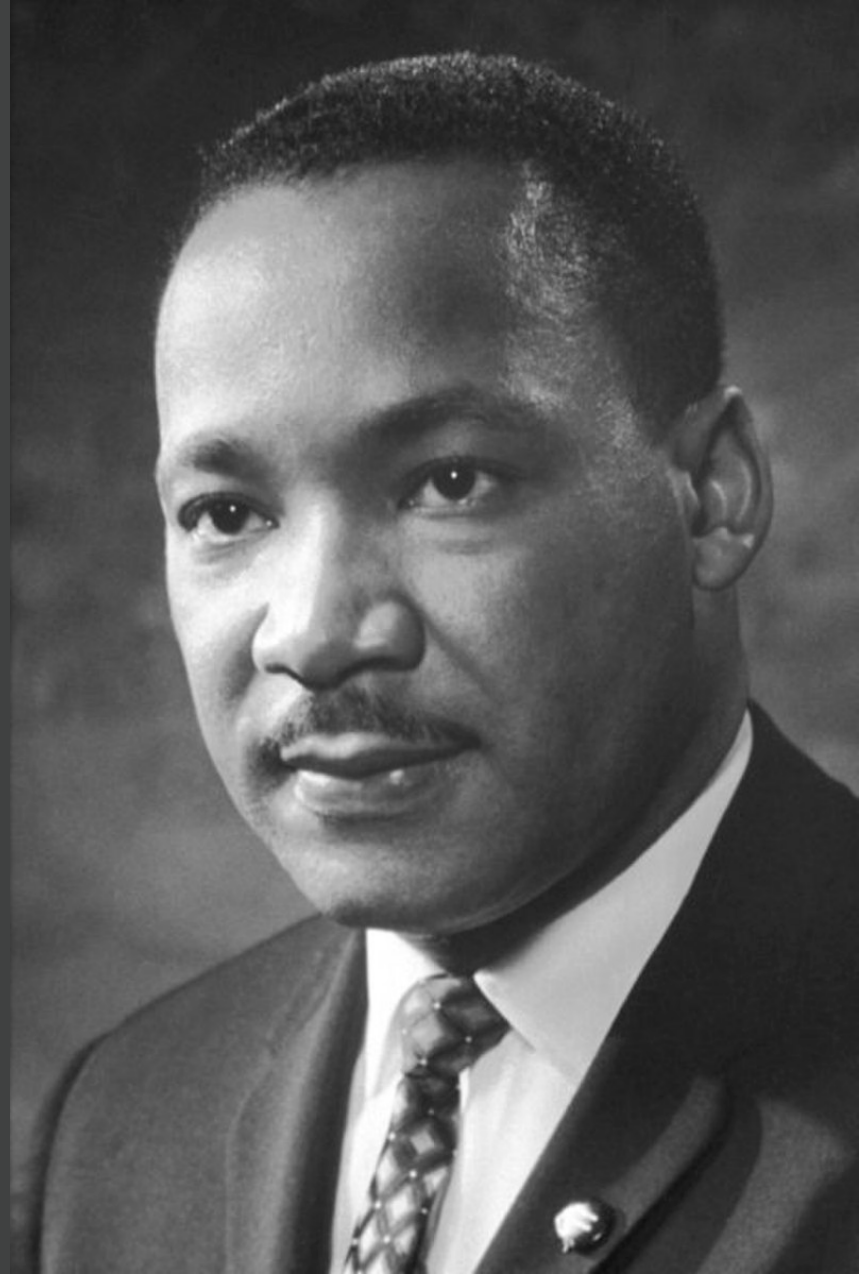
Source: DivestInvest Initiative

### NOTABLE DIVESTMENT COMMITMENTS



“A social movement that only moves people is merely a revolt. A movement that changes both people and institutions is a revolution.”

Martin Luther King, *Why We Can't Wait* (1964)



# Research questions

- Are overall divestment commitments in a country related to the total amount of fundraising in the country's oil and gas sector?
- Whose divestment commitments matter most?
  - Financials – banks, insurance companies, venture capital firms, asset managers and pension funds.
  - Non-financials – NGOs, foundations, faith-based organisations, private companies, governmental institutions.
  - Government – sovereign wealth funds and government financial institutions, city councils and regional governments.
- Is the export of financial services of investment banks influenced by the divestment commitments in the bank's home country?



# Data

- 19,057 fundraising events from Dealogic between 2000 – 2015 (5,718 equity issuances; 3,754 bond issuances and 9,585 syndicated loans).
- Industries included: oil and gas extraction, distribution, oil and gas equipment manufacturing, oil and gas well drilling, oil and gas pipeline construction and operation and oil and gas refinery and marketing.
- Cumulative fossil fuel divestment amounts by country – DivestInvest Initiative.
- Country level environmental policy stringency from OECD.



# Model

- Two-way log normal OLS regression model which accounts for country and year fixed effects and clusters model standard errors at both the country level and over time (Petersen, 2008; Kölbel, Busch and Jancso, 2017).
- Regressors lagged one year.

$$\ln(OG.Fundraising_{i,t}) = \beta_1 * \ln(Divest.Total_{i,t-1}) + \beta_2 * \ln(EPS_{i,t-1}) + \beta_3 * \ln(GDP.Capita_{i,t-1}) + \beta_4 * \ln(Env.Patents_{i,t-1}) + \beta_5 * \ln(OG.Revenue_{i,t-1}) + \beta_6 * \ln(Oil.Prod_{i,t-1}) + \beta_7 * \ln(Gas.Prod_{i,t-1}) + \beta_8 * \ln(RE.TE_{i,t-1}) + \mu_t + d_t + \varepsilon_{i,t}$$



# Results - Total O&G Fundraising

Dependent Variable: Total O&G Fundraising	Divest EPS	Taxes & Divest	Trading Schemes & Divest	FIT & Divest	Standards & Divest	R&D Subsidies & Divest	Divest & All Policy (1)	Divest & All Policy (2)	Non Financial	Non Financial Ex. Gov	Gov	Financial
Models	1.c	2.a	2.b	2.c	2.d	2.e	2.f	2.g	3.a	3.b	3.c	3.d
Divest.Total	-0.12* (0.05)	-0.13** (0.05)	-0.11* (0.05)	-0.13** (0.05)	-0.13** (0.05)	-0.14** (0.04)	-0.11** (0.03)	-0.11^ (0.06)				
Divest.Non.Financial									-0.16* (0.08)			
Divest.Non.Financial.Ex.Gov										-0.18* (0.08)		
Divest.Gov											-0.07^ (0.04)	
Divest.Financial												0.08 (0.07)
EPS	-0.61 (0.65)											
Taxes		0.31 (0.44)					0.15 (0.39)	0.15 (0.36)	0.09 (0.35)	0.10 (0.35)	0.14 (0.36)	0.18 (0.36)
Trading.Schemes			-0.36 (0.22)				-0.49* (0.24)	-0.49* (0.21)	-0.49* (0.20)	-0.48* (0.21)	-0.54** (0.18)	-0.58** (0.20)
FIT				-0.17 (0.21)			-0.22 (0.16)	-0.22 (0.20)	-0.21 (0.21)	-0.21 (0.21)	-0.23 (0.20)	-0.24 (0.21)
Standards					-0.16 (0.45)		0.04 (0.44)	0.04 (0.41)	0.07 (0.41)	0.06 (0.41)	0.03 (0.41)	0.00 (0.41)
RDsubsidies						0.67 (0.67)	0.73^ (0.38)	0.73 (0.64)	0.72 (0.65)	0.71 (0.65)	0.72 (0.64)	0.72 (0.63)
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Num. obs.	528	528	528	528	528	528	528	528	528	528	528	528
Adj. R <sup>2</sup> (full model)	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Country Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
2-Way Standard Error Clustering	YES	YES	YES	YES	YES	YES	Year Only	YES	YES	YES	YES	YES

\*\*\*p < 0.001, \*\*p < 0.01, \*p < 0.05, ^p < 0.1– Robust clustered standard errors in parentheses.



# Results - Domestic O&G Fundraising

Dependent Variable:	EPS	Divest EPS	Divest & All Policy	Non Financial	Non-Financial ex. Gov	Gov	Financial
Total O&G Fundraising from Domestic Banks							
Model	4.b	4.c	4.d	5.a	5.b	5.c	5.d
Divest.Total		-0.17 <sup>^</sup> (0.09)	-0.15 (0.10)				
Divest.Non.Financial				-0.17 (0.13)			
Divest.Non.Financial.Ex.Gov					-0.20 (0.15)		
Divest.Gov						-0.04* (0.02)	
Divest.Financial							-0.02 (0.03)
EPS	-2.55*** (0.73)	-2.39** (0.77)					
Taxes			-0.39 (0.70)	-0.44 (0.71)	-0.43 (0.71)	-0.37 (0.68)	-0.35 (0.67)
Trading.Schemes			-0.82** (0.27)	-0.84** (0.27)	-0.83** (0.28)	-0.90*** (0.26)	-0.90*** (0.26)
FIT			-0.32 <sup>^</sup> (0.17)	-0.32 <sup>^</sup> (0.17)	-0.31 <sup>^</sup> (0.17)	-0.34* (0.17)	-0.34* (0.17)
Standards			-0.65 (0.52)	-0.63 (0.54)	-0.63 (0.54)	-0.68 (0.51)	-0.69 (0.51)
RDsubsidies			-0.14 (0.74)	-0.15 (0.75)	-0.16 (0.75)	-0.16 (0.74)	-0.16 (0.74)
Control Variables	YES	YES	YES	YES	YES	YES	YES
Num. obs.	528	528	528	528	528	528	528
Adj. R <sup>2</sup> (full model)	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Country Fixed Effects	YES	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES
2-Way Standard Error Clustering	YES	YES	YES	YES	YES	YES	YES

\*\*\*p < 0.001, \*\*p < 0.01, \*p < 0.05, ^p < 0.1 – Robust clustered standard errors in parentheses.



# Results – Importing Financial Services

Total O&G Fundraising from Foreign Banks	Divest EPS	Non Financial	Non-Financial ex. Gov	Gov	Financial
Model	8.c	9.a	9.b	9.c	9.d
Divest.Total	-0.10** (0.04)				
Divest.Non.Financial		-0.14 (0.10)			
Divest.Non.Financial.Ex.Gov			-0.14 (0.11)		
Divest.Gov				-0.09* (0.04)	
Divest.Financial					0.09 (0.07)
EPS	-0.06 (0.71)				
Taxes		0.09 (0.39)	0.11 (0.38)	0.12 (0.40)	0.17 (0.40)
Trading.Schemes		-0.44^ (0.27)	-0.44 (0.27)	-0.48* (0.24)	-0.53* (0.26)
FIT		-0.08 (0.21)	-0.09 (0.21)	-0.10 (0.21)	-0.11 (0.21)
Standards		0.09 (0.53)	0.08 (0.53)	0.06 (0.54)	0.03 (0.54)
RDsubsidies		0.96 (0.77)	0.95 (0.77)	0.96 (0.76)	0.97 (0.76)
Num. obs.	528	528	528	528	528
Adj. R <sup>2</sup> (full model)	0.61	0.61	0.61	0.61	0.61
Country Fixed Effects	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES
2-Way Standard Error Clustering	YES	YES	YES	YES	YES



# Results – Exporting Financial Services

Dependent Variable: Total O&G Amount Funded by Domestic Banks Abroad	Divest EPS	Divest & All Policy	Non Financial	Non- Financial ex. Gov	Gov	Financial
Model	6.c	6.d	7.a	7.b	7.c	7.d
Divest.Total	0.04 (0.06)	0.03 (0.07)				
Divest.Non.Financial			0.03 (0.08)			
Divest.Non.Financial.Ex.Gov				0.04 (0.08)		
Divest.Gov					0.04 (0.11)	
Divest.Financial						-0.03 (0.05)
EPS	-1.68 <sup>^</sup> (0.95)					
Taxes		-0.47 (0.62)	-0.46 (0.63)	-0.46 (0.63)	-0.46 (0.63)	-0.48 (0.63)
Trading.Schemes		0.03 (0.34)	0.04 (0.33)	0.03 (0.33)	0.04 (0.33)	0.06 (0.35)
FIT		-0.62** (0.23)	-0.62** (0.23)	-0.62** (0.23)	-0.62** (0.23)	-0.62** (0.23)
Standards		-0.04 (0.44)	-0.04 (0.44)	-0.04 (0.44)	-0.04 (0.44)	-0.03 (0.44)
RDsubsidies		-0.47 (0.40)	-0.47 (0.40)	-0.47 (0.40)	-0.47 (0.40)	-0.47 (0.40)
Num. obs.	528	528	528	528	528	528
Adj. R <sup>2</sup> (full model)	0.87	0.87	0.87	0.87	0.87	0.87
Country Fixed Effects	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES
2-Way Standard Error Clustering	YES	YES	YES	YES	YES	YES

# What investment banks actually do...

DEALS APRIL 9, 2019 / 8:06 AM / 2 MONTHS AGO

## Aramco sells \$12 billion bonds out of record \$100 billion demand

Davide Barbuscia, Rania El Gamal, Hadeel Al Sayegh

7 MIN READ



Source: <https://uk.reuters.com/article/us-aramco-bond-demand/aramco-sells-12-billion-bonds-out-of-record-100-billion-demand-idUKKCN1RLONF>

DUBAI (Reuters) - Saudi Aramco is set to raise \$12 billion with its first international bond issue after receiving more than \$100 billion in orders, a record breaking vote of market confidence for the oil giant which has faced investor concerns about government influence over the company.

## Bloomberg

The success of the deal has also been seen as essential for some of the world's biggest banks, who took Aramco and officials from the Saudi government -- a wildly lucrative client -- on a worldwide roadshow last week pitching the bonds from Boston to Singapore. Jamie Dimon, chief executive officer of JPMorgan Chase & Co., touted the deal at a lunch in New York.

Source: <https://www.bloomberg.com/news/articles/2019-04-09/saudi-aramco-sells-12-billion-of-bonds-in-unprecedented-debut>





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Thank you so much for your attention! Any questions?

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# Appendix

Country	Total Divestment Commitments (\$bn)	Financial Organisations Divestment Commitments (\$bn)	Governmental Organization Divestment Commitments (\$bn)	NGOs, Academic Institutions and Faith Organisations Divestment Commitments (\$bn)
Norway	1176.40	85.81	1090.56	0.02
Switzerland	902.29	902.24	0.00	0.05
France	846.13	845.11	0.62	0.40
United States	836.48	647.53	10.85	178.10
Netherlands	807.51	807.51	0.00	0.00
Germany	795.26	790.49	1.38	3.40
Italy	628.72	628.72	0.00	0.00
Sweden	328.33	299.02	27.98	1.33
Australia	150.04	137.60	8.30	4.06
Luxembourg	131.09	131.09	0.00	0.00
UK	66.00	19.10	3.87	43.02
New Zealand	60.96	30.83	29.47	0.66
Denmark	54.97	51.65	1.40	1.92
Austria	18.70	18.20	0.00	0.50
Canada	14.67	14.30	0.00	0.37
Ireland	8.73	0.00	8.48	0.25



# Appendix

Variable Name	Variable Description	Data source
<b>OG.Fundraising</b>	Total oil and gas sector fundraising by country (equity issuances, bond issuances and syndicated loans to oil and gas companies)	Dealogic
<b>Divest.Total</b>	Total cumulative assets of institutions and organisations pledging to divest from fossil fuels by country from year of divestment pledge announcement.	Divest Invest Initiative
<b>Divest.Financial</b>	Total cumulative assets of financial organisations pledging to divest from fossil fuels from year of announcement (banks, insurance companies, venture capital firms, asset managers and pension funds)	Divest Invest Initiative
<b>Divest.Non.Financial</b>	Total cumulative assets of non-financial organisations pledging to divest from fossil fuels from year of announcement (NGOs, foundations, faith-based organisations, private companies, governmental institutions)	Divest Invest Initiative
<b>Divest.Non.Financial.Ex.Gov</b>	Total cumulative assets of non-financial organisations, excluding governmental organisations, pledging to divest from fossil fuels from year of announcement (NGOs, foundations, faith-based organisations, private companies)	Divest Invest Initiative
<b>Divest.Gov</b>	Total cumulative assets of governmental organisations pledging to divest from fossil fuels from year of announcement (sovereign wealth funds and government financial institutions, city councils and regional governments)	Divest Invest Initiative
<b>Environmental Policy Stringency (EPS)</b>	Country level annual indices of environmental policy stringency.	OECD iLibrary.
<b>GDP.Capita</b>	GDP per capita	OECD iLibrary.
<b>Env.Patents</b>	Fractional green patent counts per year.	OECD REGPAT, OECD iLibrary.
<b>RE.TE</b>	Country renewable energy as percentage of primary energy supply.	OECD Statistics.
<b>OG.Revenue</b>	Revenues of listed oil and gas companies by country.	Sustainability Accounting Standards Board SICS Classification and Bloomberg.
<b>Oil.Prod</b>	Oi production – ktoe annually by country.	OECD Statistics.
<b>Gas.Prod</b>	Gas production- bcf annually by country.	International Energy Agency (IEA)



# Appendix

<b>EPS Composite</b>	<b>EPS Policy Instrument</b>	<b>EPS Individual Policy</b>
EPS Aggregate	Taxes (0.16)	CO <sub>2</sub> , NO <sub>x</sub> , SO <sub>x</sub> ,
	Trading Schemes (0.16)	CO <sub>2</sub> , Renewable Energy Certificates, Energy Efficiency Certificates.
	Feed-in-Tariffs (FITs) (0.16)	Solar, Wind
	Standards (0.25)	Emission Limit Values: NO <sub>x</sub> , SO <sub>x</sub> and PM <sub>x</sub>
	R&D Subsidies (0.25)	Government R&D Expenditure on Renewable Energy





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